



## Ecology and conservation of golden jackal (*Canis aureus*) in Jodhpur, Rajasthan

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**Abstract:** At north-west of India there is dry, semi arid region called as The Great Indian Thar desert. It lies between 24° and 35° 5' N latitude and 70° 7' and 76° 2' E. Mammals of Thar desert includes the wolf (*Canis lupus*), the striped hyaena (*Hyaena hyaena*), golden Jackal (*Canis aureus*), the Indian desert fox (*Vulpes v. pusilla*), wild boar (*Sus scrofa*), black buck (*Antelope cervicapra*), blue bull (*Boselaphus tragocamelus*), chinkara (*Gazella benneti*), Hanuman langur (*Simulapithecus entellus*) etc. Golden Jackal is unique in distribution, occurrence, and survives at different environmental conditions in India including the hot desert. Present study has been carried out at Phitkasni village, situated south-east of Jodhpur city. Large population of golden Jackal has observed and data of their home-range, territory, inter-specific relation, conflict with human and mortality has been studied. It is concluded that regular monitoring and proper conservation management is needed in this area so Jackal and other carnivore like wolf, desert fox and hyena can also be conserved.

**Keywords:** Conservation, Desert, Jackal, Population, Wildlife

### INTRODUCTION

The Thar desert (TD) has resulted from climatic and geo-tectonic changes in the past and almost continues into the 'Sahara desert' through mid-eastern deserts. The flora and fauna of the TD is important from bio-geographic point of view as it presents an admixture of Palaearctic and Indo-Malayan elements (Prakash, 1974). Western Rajasthan comprises of huge desert and specific geographical distribution in India, which is called as The Great Indian Thar Desert (GITD). TD is spread over parts of Gujarat, Rajasthan, Haryana and Punjab, extending into Pakistan. It extends over about 446,000 km<sup>2</sup>, of which 208,110 km<sup>2</sup> lies in India and rest in Pakistan (Idris *et al.*, 2009). Desert itself is an ecosystem. Many animals are inhabited in TD, some animals are endemic to this particular area, for example The Great Indian Bustard (*Ardeotis nigriceps*) which is found only in GITD.

Nineteen species of carnivores have been reported from India and during the late 19th century, the TD, in the North-west part of India, supported excellent mammalian faunal diversity due to low human density (Blanford, 1888-91; Jerdon, 1874; Prater, 2005). And ten of these nineteen species of carnivores have been reported in this desert area out of forty five mammalian species (Chhangani and Mohan, 2010, Rajpurohit *et al.*, 2011). Western Rajasthan (WR) is vast in distribution and comprises of desert and many faunal species including some endemic species.

Earlier time in history large mammals mostly lion (*Pantheraleo*), cheetah (*Acinonyx jubatus*) and the

desert lynx were common in the southern part of the desert. Even up to 1930s large herds of blackbuck, blue bull, and wild boar were found in many areas of TD (Prakash, 1988). Tiger (*Pantheratigris*) and panther (*Pantheropardus*) was found in fair numbers in the rocky habitat. However, now a day their populations have dwindled to a danger of extinction, the lion and cheetah are already lost from the TD. The only mammals of conservation importance surviving in remote location of desert are the Indian gazelle and the desert hare (*Lepus nigricollis*). Even the predators like the wolf (*Canis lupus*), Jackal (*Canis aureus*), the desert cat (*Felislybica*), the desert fox (*Vulpes vulpes*) and the Indian wild ass in the Rann of Kutch (Gujarat) have succumbed to the greed of the man for their pelts (Prakash, 1975a). Of all variety of mammals, the rodents are most abundant species of desert regions around the world including TD (Prakash, 1975b).

Jackal is successful hunter, especially of rodents although they are scavenger. They tolerate human presence more readily than the wolf (*Canis lupus*) is thus, commonly seen around human settlements (Menon, 2014). Golden Jackal is one of the most common canid, having an extensive range covering contiguous areas of Asia and Europe (Macdonald and Sillero-Zubiri, 2004) extending from Arabian Peninsula into Western Europe to the entire Indian subcontinent (Jhala and Moehlman, 2008). Golden Jackal is an elective scavenger, and opportunistic forager which utilizes diverse food resources (Jhala and Moehlman, 2008), that varies according to season

and the habitat they are living in. Their diet comprises mostly small- to medium-sized preys like rabbits, rodents, birds, insects and fishes, and plant material (Yom-Tov *et al.*, 1995; Aiyadurai and Jhala, 2006; Majumder *et al.*, 2011; Jhala and Moehlman, 2013).

Despite the fact that golden Jackal has considered the least concern species by IUCN (Jhala and Moehlman, 2008) with a generalist nature (habitat and food), its population has undergone significant decline in the recent past in many parts of its geographical range including India (Giannatos *et al.*, 2005; Jhala and Moehlman, 2008). Therefore, population assessment and monitoring of golden Jackal are necessary at landscape and global scales that helps in understanding the reaction of a species to changing habitat (Halpin, 1997).

## MATERIALS AND METHODS

**Study area:** Sixty percent of the desert is situated in north-western part of Rajasthan state. The 'Thar' desert is situated in the west of the Aravali mountain ranges and lies between 24° and 35° 5' N latitude and 70° 7' and 76° 2' E longitude (Husain, 2010).

Our Study was conducted at Phitkasni village, around 30km south from Jodhpur City. Mostly Bisnoi community lives and practice agricultural activity there. This Village habitat is agricultural, scrubbed, rocky area. This village is undisturbed from human settlement and good habitat for many mammals lives around this area. Mammals of TD includes the wolf (*Canis lupus*), the striped hyaena (*Hyaena hyaena*), golden Jackal (*Canis aureus*), the Indian desert fox (*Vulpes v. pusilla*), wild boar (*Sus scrofa* sp.), black buck (*Antelope cervicapra*), blue bull (*Boselaphus tragocamelus*), chinkara (*Gazella benneti*), rhesus monkey (*Macaca mulatta*), hanuman langur (*Semnopithecus entellus*), the desert cat (*Felis lybica*), mongoose (*Herpestes* sp.), porcupine (*Hystrix* sp.), desert hedgehog (*Hemiechinus sauritus*) etc. In south-east of the Jodhpur city, there are pink and grey granite islands in the desert sand at Phitkasni-Rasida and Salawas-Nandanvan areas of Malani Igneous Suite (Shrivastava *et al.*, 2013). No accurate number of the Jackal population in study region are available. In Phitkasni village there is granite rock which is locally called as Sagri Bhakhar has become our study site in this village. The GPS location taken from google map of that granite rock lies between 26.211500N and 73.1171490S. Vegetation of this study area is mainly includes Khejri (*Prosopis cineraria*), Ber (*Ziziphus nummularia*), Ker (*Capparis deciduas*), Kumat (*Acacia senegal*), Neem (*Azadirachta indica*), Babul (*Acacia nilotica*), Aak (*Calotropis procera*) etc. Habitat of this area is rocky and sandy scrubbed desert. Climatic condition is Semi arid and temperature remains lowest at around 5 degree centigrade and highest at around 48 degree centigrade. This site is free

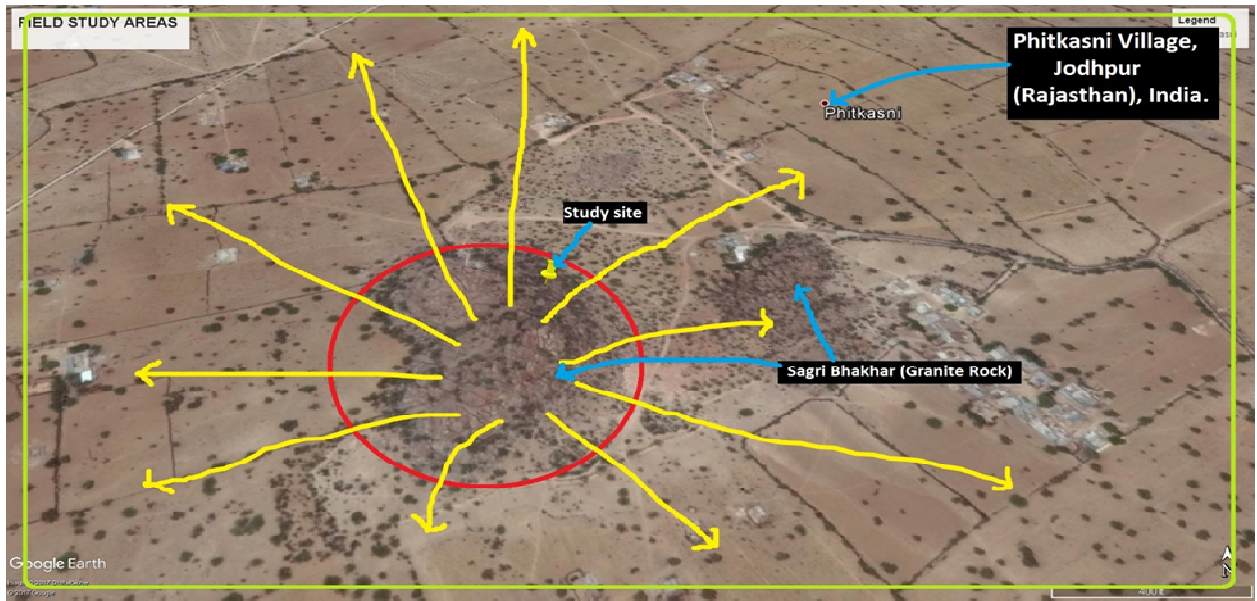
from human settlement and very less number of human population lives there.

Data were collected by visiting study site for 10 times from July to October, 2016 and for each visit we stayed for 3-4 days for close observation of focal animal. First, village was surveyed and local people were interviewed. Thereafter, ecology of area was studied. There is a close observation to individual of focal animal pack where data of their territory, home range, population, death and survive causes and their ecology was recorded. Night vision camera traps were settled at different location of that area and data were collected. For studies, direct sighting, survey, interview, photography, video recording and Altman (1974) field technique mainly scanning and focal sampling methods were followed and pugmark and scat sample was photographed. Scats were collected on transects, trails and roads whenever encountered within the intensive study area. All collected scat sample was labeled with the date, location and name of the species. The questionnaire forms were used for study and information are collected about species in survey. Locals inhabiting study areas were interviewed. Questionnaire survey carried out in study area. And hundred people were asked in study area if they have encountered Jackal in the past or recently. Questionnaires forms include much information as like animal Identification, Knowledge about Animal, Local name of Animal, location and no. of animal.

## RESULTS

There is a granite rock with lots of cracks and caves, where focal animal lives. During study period in July to October, 2016, about 40-50 Jackals were sited there. There is a granite rock with lots of cracks and caves, where focal animal lives. Their home range and activity pattern is mapped and shown on Fig.1.

**Home range and foraging Behavior:** Jackal is scavenger and sometimes it hunts small prey like rodents. There was close watch on focal animal pack. It is observed that they come out from their den at around 4 o'clock. They form packs and we sited 15 Jackal together in pack during study. Late in the evening, they split in their family and forage in different directions. During this study average 25 to 30 animals observed in one visit. All families do not follow the same route for forage, they change their routes, it is confirmed by after placing camera traps at same location for continuous 3 days and a single family were closely observed (a family with distinct feature were selected). They go to 5-6 km away for foraging from their territory and returns around 3-4 o'clock in the morning (summarized in Table 1). Their activity has recorded in camera trap (Figs. 2 and 3) and landscape view of rock shown in Fig. 4 and direct sighting of Jackal activity at study area were photographed which is shown in Fig. 5.



**Fig.1.** Satellite view (Google map) of Village Note: Red circle- Territory area (Core), Green Boundry- Home range, and Yellow marks- Daily activity direction of Jackal.



**Fig.2.** Jackal recorded in camera trap1.



**Fig.3.** Jackal recorded in camera trap2.



**Fig.4.** Landscape view of Sagri Bhakhar at Phitkasni village.



**Fig.5.** Jackal activity in early evening.

**Jackal-human conflict:** Jackal human conflict is one of the main constraints to biodiversity conservation efforts near and outside many protected areas worldwide. During the study it was found that livestock depredation caused by Jackal and other wild

carnivore species in the Rajasthan performed. However, the difference in attack rates was attributed to a difference in the size of the livestock populations (Rajpurohit *et al.*, 2011). There is positive correlation between Jackal and human found. At the study sites

**Table 1.** Jackal's daily routine activity schedule at study site summarized.

Time ( Summer )	Activity Recorded
3:00 – 5:00 am	Return to their territory.
5:00 – 9:00 am	Rare activity like drinking and wandering.
9:00- 15:30 pm	No activity, remain hidid in caves.
15:30 to 18:00 pm	Come out of caves and rest.
18:00-6:00 am	Families splits and foraging behavior observed.

Jackal found well adapted and settled with human population dwelling there, which is rare to observe.

**Inter-specific relation:** Beside Jackal, there are many other species recorded during this study, which include desert fox, chinkara, black buck, blue bull and Indian crested porcupine. It is found that desert fox and Jackal share same foraging area and habitat, there is commensalism found between both species. Both the species sighted together at same time and same place at study site.

**Role of local people in conservation of wildlife:** Mostly Bisnoi community people live there, this community always ready to sacrifice their life especially for protecting black buck and chinkara. There are many more sacrifices have seen to save trees and wildlife in WR. The Bisnoi are not alone in the practice of protecting wildlife, but they are unique in that they have been specifically protecting this species for more than 500 years (Brockmann and Pichler, 2008; Jain, 2011). Thus, it is obvious that Jackal and other wild animals feel safe and roam freely in their villages, therefore focal animal wanders in Gurrha Bisnoi, Khejerli and Jhalamand villages.

**Mortality factor:** From past 30 years there is intense increase in human population which has result in extra need of food, lands and other resources. This demand has put direct impact on destruction of Jackal's habitats and resources. Thus, Jackal have restricted their territory to small patches in western Rajasthan. Due to growing urbanization, roads are being constructed to connect many villages, has leads to increase chance of road accident cases of Jackal. Mortality due to predation is not observed because no predators are present for Jackal, however, death due to scarcity of food, water is possible. No road accident is observed during study period for this area while road accident often seen at main road near Jhalamand village.

## DISCUSSION

The golden Jackal is fairly general throughout its range. Its high densities are observed in mountain and rocky areas of TD and where food and water source is present in dry areas. They are found near human settlement which is rare to see with other large mammals. In India, Jackals population higher densities achieved in south western, Rajasthan. Study on breeding pack units and radio collard individuals, Jackal densities in the semi-arid Velavadar National

Park were estimated between one and two individuals per km<sup>2</sup> (Jhala and Moehlman, 2004; Devilal *et al.*, 2016).

Present study suggest that Jackal population at Phitkasni village is very high, 40 Jackal have recorded there and packs of 15 individual have observed during study. Generally 5-6 individual in packs have been sighted in other areas of western Rajasthan. Sagri Bhakar is only accessible rock in this area for Jackal, there is Forest guard chowki behind this rock, but there is no guard for regular monitoring of wildlife in this area. The data of other mammals are collected by interacting and interviewing local people of Phitkasni village. No human and Jackal conflict has reported and observed in this area. Study also suggests that animal has to forage long area for food, and water, there is scarcity of water bodies in this area. This study area SagriBhakar can be called as land of Jackals. Large number of individuals inhabit in this area and no human interference and inter-specific competition observed while study. Conservation has become important for these animals and villagers belong to Bisnoi community which protect and conserve wildlife.

## Conclusion

Large population of Jackal has observed in study site even though their conservation is important in this area.

Both positive and negative aspect observed at study area, includes the presence of Forest Department Chowki, local people are not interfering with these animals and the presence of good habitat for Jackals in form of scrubbed granite rocks. The negative aspect of area includes no forest guard for regular monitoring in Forest chowki, no water sources is available nearby and cattle and domestic animal interference have observed. This large population of Jackal can be increased and conserve in this area, for that there should be regular monitoring by forest/wildlife wing, and water tanks should be made in this area and awareness about wild animals and their importance to local people is needed.

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